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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/600,619

06/23/2003

Jong-Pyng Chen

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2292 7590 01/19/2007  
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EXAMINER

CREPEAU, JONATHAN

ART UNIT

PAPER NUMBER

1745

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
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3 MONTHS

01/19/2007

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 01/19/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

**Office Action Summary**

Application No.

10/600,619

Applicant(s)

CHEN ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 14, 2006 has been entered.

Claims 1-21 are pending and are addressed herein. The claims are newly rejected under 35 USC 102 and 103. This action is non-final.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 7, 8, 13-16, 18 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Rajendran (U.S. Patent 5,981,097) as evidenced by WO 96/29752. The Rajendran reference is directed to a cation exchange membrane having at least three layers. Each layer comprises a cation exchange polymer (see abstract). As disclosed in column 4, line 22, inorganic filler may be incorporated into some or all of the layers of the membrane. It is further taught that

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if the filler is used in only one layer, it is preferable for the surface layer facing the anode to contain the filler. The filler may be that as described in WO 96/29752 (see col. 4, line 22 of Rajendran). Such materials include proton conductors such as zeolite, hydrogen mordenite, and zirconium phosphate (see page 9 of WO '752). Regarding claims 7 and 8, the organic polymer may comprise fluorine-containing resin such as PVDF (see col. 3, line 47). The laminated membrane is used as the electrolyte in a direct methanol fuel cell (see col. 3, line 8). Regarding claims 13 and 14, WO '752 teaches that the inorganic conductor is doped (i.e., physically blended) into the organic polymer (see Example 2). Regarding claim 15, Rajendran teaches that the layered structure is formed by laminating under heat and pressure (see col. 6, line 2). Regarding claim 18, cation exchange groups can be introduced after lamination is performed (see col. 6, line 13).

Thus, the instant claims are anticipated.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 11, 12, 17, 20, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajendran.

The reference is applied to claims 1-4, 7, 8, 13-16, 18 and 19 for the reasons stated above. However, the reference does not expressly teach the methanol permeability and proton conductivity values recited in claims 11, 12, 20, and 21.

However, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be sufficiently guided to optimize these values, thereby rendering the claimed ranges obvious. In column 2, line 60, the reference teaches that "in a fuel cell in accordance with the invention, methanol crossover is substantially reduced, up to about 50% when preferred membranes are employed." Thus, a low methanol permeability is a goal of the invention and the artisan would be guided to achieve a low value of the methanol permeability. Furthermore, the artisan would be motivated to optimize the proton conductivity of the membrane while keeping the methanol permeability at a relatively low value. Accordingly, the claimed ranges are not considered to distinguish over the reference.

Regarding claim 17, it would be obvious to perform the lamination step using an adhesive, especially if the selected polymer(s) lack the necessary adhesiveness to properly form the layered membrane. As such, claim 17 is not considered to distinguish over the reference.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajendran in view of Asukabe et al (U.S. Pre-Grant Publication No. 2001/0026893).

Rajendran is applied to claims 1-4, 7, 8, 13-16, 18 and 19 as stated above. However, the reference does not expressly teach that the base polymer comprises PVDF-g-SPS, as recited in claim 5.

Asukabe et al. is directed to a polymer electrolyte membrane comprising, among other materials, PVDF-g-SPS (see pars. 33 and 34).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the PVDF-g-SPS of Asukabe et al. in the membrane of Rajendran. In paragraph 36, the Asukabe reference lists numerous advantages of the invention, including good electrode adherence, easy humidification, and excellent stability. As such, the artisan would be motivated to use the PVDF-g-SPS of Asukabe et al. in the membrane of Rajendran.

7. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rajendran in view of Murphy et al (U.S. Patent 6,059,943).

Rajendran is applied to claims 1-4, 7, 8, 13-16, 18 and 19 as stated above. However, the reference does not expressly teach that the base polymer comprises a non-fluorinated polymer such as polysulfone, as recited in claims 9 and 10.

Murphy et al. is directed to an organic/inorganic electrolyte membrane that may comprise, among other materials, PVDF and polysulfone (see col. 8, line 65).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the polysulfone of Murphy et al. in the membrane of Rajendran. The disclosure of Murphy et al. suggests that the polymers listed at column 8, line 59, including polysulfone and PVDF, are functionally equivalent for use in a hybrid organic/inorganic PEM. An express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982); MPEP §2144.06. As such, it would be obvious to use polysulfone in the membrane of Rajendran.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jonathan Crepeau  
Primary Examiner  
Art Unit 1745  
January 10, 2007